SparkLab SCIENCENTRE

AT QUEENSLAND MUSEUM

Australian Curriculum Links for Years 7 - 8

Term 2, 2023

SparkLab is a Sciencentre experience at Queensland Museum. Refer to the Exhibition Guide for an overview of the interactive exhibits and programs.

SparkLab exhibits and programs link to the Australian Curriculum specifically in the learning areas of Science, Technologies and Mathematics, and support students to develop their general capabilities in Literacy, Numeracy, and Critical and Creative Thinking.

General capabilities relevant to SparkLab

Direct links	
Literacy	**Critical and Creative Thinking**
Comprehending texts through listening, reading and viewing.	Inquiring – identifying, exploring and organising information and ideas.
Text, word and visual knowledge.	Generating ideas, possibilities and actions.
Numeracy	Reflecting on thinking and processes.
Recognise and using patterns and relationships.	Analysing, synthesising and evaluating reasoning and procedures.
Using spatial reasoning.	
Using measurement.	

Science

	Knowledge and Understanding	Science as a Human Endeavour and Science Inquiry Skills	Sample of linked *SparkLab* exhibits and programs
Year 7	Physical sciences (ACSSU117) Change to an object's motion is caused by unbalanced forces acting on the object.	Questioning and predicting (ACSIS124) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge. Planning and conducting (ACSIS126) In fair tests, measure and control variables. Processing and analysing information (ACSIS130) Summarise data and use scientific understandings to identify relationships and draw conclusions. Evaluating (ACSIS131) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method. Communicating (ACSIS133) Communicate ideas, findings and solutions to problems using scientific language.	**Rotation station:** Students spin in a chair and *investigate* how moving their mass closer to the centre axis and changing their rotational inertia changes the speed of their rotation. **Flight test:** Students *design* and *create* a flying machine out of paper and *test* their design in the vertical wind tunnel. Describe how your machine moves in the air flow. *Modify* the design to see the impact of that change. *Explore* how a change in wind speed affects how the machine moves in the air. **Air cannon:** Students lift a heavy bowling ball and let it fall from varying heights. The ball pushes the air in the large tube into a smaller tube, causing a light tennis ball to fly up high. Students *compare* how changing what happens to the bowling ball affects the movement of the smaller ball. **Gravity run:** Students *use* a series of pipes, curves, wheels, hanging bells and balls to *explore* forces, motion and energy transfer and transformation. Students work together to *develop* a successful ball run or extending the challenge to *create* a run that fits to a set criteria. **Slow the fall:** Students *select* and drop discs made of varying materials and with varying patterns between a track lined with magnets. Eddy currents within the discs generate a magnetic field. *Compare* how the different discs fall due to the interaction between the two magnetic fields.

			Science Bar: Under pressure Students *select* and recognise how different substances behave and change in a vacuum chamber – where the air pressure is decreased and increased. They *consider* forces when observing changes. This program is facilitated by a Learning Officer, however the investigation is directed by the students. **Science Bar: Going down hill** Students *investigate* how they can change how something moves down a ramp. The *predict* outcomes, *discuss* their observations and *justify* their explanations. This program is facilitated by a Learning Officer.
	Earth and space sciences (ACSSU116) Some of Earth's resources are renewable, but others are non-renewable.		**Energy from the sun/wind circuits:** Students *create* circuits by connect wires to solar cells and wind turbines and *use* these alternative sources of energy to generate electricity and make a light glow or disc spin. **Science on a Sphere:** Students can *select* a number of information datasets on our 1.8m sphere, showing information collected from satellites or ground-based instruments. Different datasets explore resources such as water in dams and reservoirs, and Drought risk – real time. Land use can be explored with Forest Change, Vegetation – Real time and Crop Density. Other datasets can lead to discussion around energy use, including Air traffic around the Earth, Human Transportation and electricity/fire use with Night-time lights (colourised) There are over 40 presentations (datasets) on the free-choice kiosk and a Learning Officer can access over 500 datasets via an iPad.

Year 8	Chemical sciences (ACSSU151) The properties of the different states of matter can be explained in terms of motion and arrangement of particles. Chemical sciences (ACSSU225) Chemical change involves substances reacting to form new substances.	Questioning and predicting (ACSIS139) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge. Planning and conducting (ACSIS141) In fair tests, measure and control variables. Processing and analysing information (ACSIS145) Summarise data and use scientific understandings to identify relationships and draw conclusions. Evaluating (ACSIS146) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method. Communicating (ACSIS148) Communicate ideas, findings and solutions to problems using scientific language.	**Touch the lightning**: Students interact with a large plasma ball and *investigate* the intensity of the plasma filaments and *determine* where and why they are attracted to certain positions on the glass globe. **Air flow:** Students *test* two different vehicles in a wind tunnel (using mist trails) and *investigate* with varying the position of the vehicle and the wind speed. They *evaluate* effective design and also *explore* turbulence and laminar flow. **Cloud rings:** Students *apply* a changing force onto a rubber membrane, which forces mist out of a circular hole. *Consider* how the property of a fluid relates to the shape the cloud takes as it rises to the ceiling. *Explore* if there are ways to change the shape or how it moves. **Science Bar: Mix Master**: Students *predict* and *recognise* what happens when a variety of household products are mixed together. *Consider* if a chemical change has occurred by *examining* the evidence. This program is facilitated by a Learning Officer, however the investigation is directed by the students.
	Physical sciences (ACSSU155) Energy appears in different forms including kinetic energy, heat and potential energy, and causes change within systems.		**Circuits:** Students *create* circuits and *explore* the components of circuits along with electrical energy transforming into light energy (bulbs) or kinetic energy (hand dryer fans), and how light sensors can complete a circuit and trigger an alarm. Students also *explore* energy generated from solar cells and wind turbines **Gravity run:** Students *use* a series of pipes, curves, wheels, hanging bells and balls to *explore* forces, and energy transfer and transformation. Students work together to *investigate* how to make

			a variety of successful ball runs. Students can *investigate* potential, kinetic and sound energy. **Science Bar: Snap, crackle, watt?** Students *predict*, *select* and *recognise* which materials, when rubbed together, will generate static electricity. Students then *investigate* how static electricity can be used to make something move. This program is facilitated by a Learning Officer, however the investigation is directed by the students. **Science Bar: Melting moments** Students *investigate* how we can change a way that a solid melts. Students *identify* and *select* different ways to produce heat and different surfaces to explore energy transfer. Students *generate* questions, *recognise*, *predict* and *explain* their thinking. This program is facilitated by a Learning Officer.
	Earth and space sciences (ACSSU153) Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales.		**Science on a Sphere:** Students can *select* and explore a number of presentations on our 1.8m sphere, showing information collected from satellites or ground based instruments. Different presentations explore: Plate movement – 200 million years ago to today, Earthquakes – real time, Earthquakes and Eruptions 1960-2010, Age of Seafloor and more.

Technologies – Design and Technologies

	Knowledge and Understanding	Design and Technologies Processes and Production Skills	Sample of linked *SparkLab* exhibits and programs
Year 7 - 8	Analyse ways to produce designed solutions through selecting and combining characteristics and properties of materials, components and equipment. (ACTDEK034)*	Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms. (ACTDEP036)* Independently develop criteria for success to evaluate design ideas. (ACTDEP038)	**Maker Space:** *Use* everyday materials to design and *construct* solution to the Maker Space challenge – **Take a seat.** *Design* and *construct* a prototype mini chair. Be inspired by different examples of chairs in the stimulus material and *consider* the different parts of a chair. *Decide* on who might use this chair, how they might use it and what they might need. *Explore* the properties of different materials as you *select* materials for your design. *Consider* how the properties of the materials, the shapes and structures you make, and the location of the centre of mass, will make your chair strong and stable. *Test* your design using toys or manikins. *Modify* your initial design ideas to make your design as effective as possible and to meet your user's needs. C*onsider* how changing one part, may change the effectiveness of your design. **Gravity run, Flight Test and Balance bridge:** Students *investigate* how to design a solution to the challenges posed at each of these exhibits. Through design thinking, students *construct*, *test* and improve on their designs.

* Indirect link

Cognitive verbs are italicised.